

## Remarks

Claims 1-16 are pending. Favorable reconsideration is respectfully requested.

Claim 10 has been amended to add a period at the end of the claim.

Claims 14, 15, and 16 have been amended to correct the preamble of each to refer to "vinyl ester-ethylene copolymer" rather than "vinyl ester polymer," and to remove "lauric acid" which is not a branched carboxylic acid as required by the claim. Claims 14, 15, and 16 are dependent on claim 13 which recited "vinyl ester-ethylene copolymer." This error was not previously recognized and thus Applicants have not had a chance to make this correction. No new matter is added by virtue of these amendments. Entry is respectfully solicited, and withdrawal of the rejection of claim 10 under 35 U.S.C. § 112, ¶ 2, is solicited.

The present invention is directed to low emission adhesives which find particular use as interior adhesives such as parquet, floor tile, and ceiling tile adhesives, etc. In the past, in order to provide adhesives with sufficient tack, alkyl acrylates have been copolymerized with other unsaturated monomers, preferably vinyl acetate and ethylene. Although the copolymers had good tack properties, the alkylacrylates hydrolyze over time to the free alkanol. The presence of the free alkanol, liberated over months from the adhesive, leads to environmental (toxicological) concerns. The problem addressed by Applicants is to provide a tacky adhesive with no emission of alkanol. Applicants solved this problem by providing aqueous dispersions of a copolymer prepared from four principle comonomers: a) 5-50% ethylene; b) 20-80% of a vinyl ester of a C<sub>1-9</sub> carboxylic acid whose homopolymers have a glass transition temperature (T<sub>g</sub>) > 0°C; from 5-70% of a vinyl ester of a branched C<sub>8-13</sub> carboxylic acid whose homopolymer has a T<sub>g</sub> < 0°C; and d) from 0.5 to 10% of an ethylenically unsaturated mono- or dicarboxylic acid. The branched low T<sub>g</sub> vinyl ester monomer is necessary to provide the required degree of tack in the absence of alkylacrylates. The absence of the latter overcomes the emission problems alluded to.

The claims have been rejected under 35 U.S.C. § 112, ¶ 2, the Office stating that the “wherein” clause at the end of the independent claims conflicts with optional component (e) in these claims. Optional component (e) is a hydroxyalkyl(meth)acrylate ester. The “wherein” proviso indicates that the claims are free of (meth)acrylate alkyl esters. While Applicants understand the Office’s questioning of this clause, there is in fact no conflict. The purpose of the invention, as stated, is to minimize emissions of alkanols produced by hydrolysis over time of alkyl(meth)acrylates. It is for this reason this class of monomers is excluded from the claims. Component e) is not an alkyl(meth)acrylate, but a hydroxyalkyl(meth)acrylate, which is different. First, these monomers are capable of crosslinking with the free carboxylic acid groups (d) to form an ester. To be liberated as an organic material, both ester groups would have to be hydrolyzed which is a less likely occurrence than hydrolysis of one ester group.

Second, the hydrolysis would not liberate an alkanol, but a glycol. Not only does the additional hydroxyl group render the vapor pressure of glycols much lower than the corresponding alcohol, but also, the glycols are not suspect environmentally, i.e. ethylene glycol (from 2-hydroxyethyl(meth)acrylate and propylene glycol from 2-hydroxypropyl(meth)acrylate). Since hydroxyalkyl groups and alkyl groups are not the same, there is in fact no conflict within the claim. Withdrawal of the rejection of the claims under 35 U.S.C. § 112, ¶ 2 for this reason is solicited.

Claims 1-16 have been rejected under 35 U.S.C. § 102(b) over Weissgerber et al. U.S. Patent 4,997,879 (“*Weissgerber*”; commonly assigned). This is a new rejection. Applicants respectfully traverse the rejection.

*Weissgerber* is directed to aqueous adhesives with improved adhesion. The *Weissgerber* compositions are prepared by polymerizing four required monomers: a) ethylene (same as subject invention although range differs); d) ethylenically unsaturated carboxylic acids (same, but range differs); e) hydroxyalkyl functional compounds (Applicants’ optional compound e); and c) (out of order), vinyl ester(s) (not the same as Applicants; see text below). Optional components include b) acrylic esters (used in every example and expressly excluded

by Applicants), f) (meth)acrylamide (used in every example), and g) ethylenically unsaturated sulfates or sulfonates or polyunsaturated compounds (not used in any example).

Applicants respectfully submit that *Weissgerber* does not anticipate the claimed subject matter for several reasons.

First, the subject invention claims require the absence of alkyl(meth)acrylates. While it is true that *Weissgerber* allows “0%” of alkylacrylates, he also promotes their use. *Weissgerber* indicates that in his copolymers, “[p]referably n-butyl acrylate and/or 2-ethylhexylacrylate are used” (emphasis added), col. 2, lines 1-2). He exemplifies this preference by using 2-ethylhexylacrylate in each example.

*Weissgerber* does not require absence of alkylacrylates. Rather, *Weissgerber* actually employs alkylacrylates and in fact prefers their use. The subject invention is non-obvious over *Weissgerber*. It is well established that if an invention is non-obvious over a reference, the reference cannot anticipate either. *See, e.g. In re Kalm*, 154 USPQ 10 (CCPA 1967).

The *Kalm* case is very analogous to the present situation. In *Kalm*, the prior art reference did not teach or suggest the problem solved, nor the result (depressant action). Rather, the compounds described by the prior art were antidepressants. The structural formula of the prior art defined a limited genus, and included the claimed compounds within its scope, were one to make the proper choices of substituents. The rejection was not under 35 U.S.C. § 103, but under 35 U.S.C. § 102.

Here, a compound *per se* is not involved, but a copolymer. However, analogous to the compounds involved in *Kalm*, here, to produce the claimed copolymer, proper choices of monomers (rather than substituents), must be made.

The Office in *Kalm* had attempted to rely on *In re Petering*, 133 USPQ 275 (CCPA 1962) for the proposition that when the choices are small, a subgenus is described and therefore anticipated by a larger genus. However, the Court disagreed. The Court cited *In re Rushig*, 145 USPQ 274, 282 (CCPA 1965):

We did not intend our Petering opinion or decision to become a precedent for the mechanistic dissection and recombination of the components of the specific illustrative compounds in every chemical reference containing them, to create hindsight anticipations with the guidance of an applicant's disclosures, on the theory that such reconstructed disclosures *describe* specific compounds within the meaning of section 102.

Noting that the prior art reference (*Siemer*) did not teach or suggest the properties of the claimed compounds (*Kalm*, depressants; here, low emissivity), the Court stated, first, that

it is somewhat difficult for us to comprehend how appellant's compounds may be *unobvious* in view of a reference, yet at the same time be said to be *described* by the same reference as the Patent Office has held here. Necessarily, a description in a reference which is insufficient as a matter of law to render a composition of matter obvious to one of ordinary skill in the art would a fortiori be insufficient to "describe" the composition as that term is used in 35 U.S.C. 102(e), a complete description being but the ultimate or epitome of obviousness.

The Court went on to state

It is the position of the Patent Office that the presently claimed compounds fall within the scope of the "genus" disclosed by Siemer. A cursory inspection of the Siemer reference might lead one to that unwarranted conclusion. The solicitor asks that we look at the specific exemplary compounds of Siemer<sup>3</sup> in order to determine the substituents he preferred and to establish the narrow scope of his generic disclosure. We have done so. If any preference of Siemer can be ascertained, it is for compounds . . . [not being claimed].

Finally, the Court states:

When one speaks of a "genus" in the chemical arts, one ordinarily speaks of a group of compounds closely related both in structure and in properties. . . . It is quite evident that Siemer

never made the present compounds; or if he did, he never tested them to determine what effect they would have on the central nervous system, since, if he had, he could not logically have failed to report the seemingly anomalous result appellant has discovered.<sup>1</sup>

Here, Applicants' compositions are for adhesives which generate low emissions. *Weissgerber* does not direct one skilled in the art to such compositions. Rather, *Weissgerber* employs 2-ethylhexylacrylate in each of his adhesives. The presence of 2-ethylhexylacrylate causes 2-ethylhexanol to be generated over time, something unknown to *Weissgerber*. See page 16 of the present application in this respect.

*In re Shaffer*, 108 USPQ 326 (CCPA 1956), discussed in the prior response, is again relevant to the inquiry. While the Office asserts that the problem addressed by the Applicants is only one of many factors to be considered, Applicants fail to find any such language in *Shaffer*. Rather, *Shaffer* specifically states that a reference which does not address a problem cannot suggest a solution. Applicants have examined both the *Lintner* and *Kronig* decisions cited by the Office, and do not find them on point. In both cases, the prior art taught or suggested each ingredient of the claimed composition. In each case, the Applicants asserted that one ingredient of the claimed formulation was present for a different purpose. Nevertheless, the ingredient was present. That is not the case here.

In the present case, the ingredient preferred by the prior art (alkylacrylates) are not present: they are specifically excluded. The situation would be different if Applicants were claiming copolymers containing alkylacrylates, but adding the alkylacrylates for a different purpose than that disclosed by the prior art. Then *Lintner* and *Kronig* would apply. In all fairness, however, it must be stated that although *Weissgerber* allows use of 0% alkyl acrylate, he does not single out 0% acrylate, and thus does not place the invention in the hands of the public. It must be recognized that nearly all patents issued are within the broad

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<sup>1</sup> Analogous to *Kalm*, *Weissgerber* never made any polymers which did not include an alkylacrylate. Therefore, he could never appreciate the results achieved by Applicants with respect to emissions.

teachings of the prior art. However, merely because they are subsumed in the prior art disclosure does not mean that a patentable invention has not been made. *Ex parte Kuhn*, 132 USPQ 359 (POBA 1961). This is the reason for cases such as *Kalm*, *Shaffer*, and *Kuhn*, discussed in Applicants' last response. The real question is whether the reference fairly describes the invention so as to place it in the hands of the public. That is not the case here.

*Weissgerber* discloses adhesives prepared from a different set of monomers, and prefers to employ alkyl acrylates. One skilled in the art, wishing to produce a tacky adhesive, would be directed by *Weissgerber* to do as he did in his examples, employing an alkylacrylate. This is what those skilled in the art conventionally do. Alkylacrylates are tackifying monomers. However, such adhesives would be emissive.

Second, *Weissgerber* does not mandate the use of a vinyl ester of a branched carboxylic acid of 8-13 carbon atoms whose homopolymers have a  $T_g < 0^\circ\text{C}$ . *Weissgerber* allows only a single vinyl ester to be used if desired, for example, vinyl acetate or vinyl propionate. *Weissgerber* does mention branched vinyl esters, i.e. vinyl versatates, and identifies the  $\text{C}_{10}$  ester (Veova10) as a preferred versatic ester.<sup>2</sup> While Veova10 may be the preferred versatic acid ester, it is clear that vinyl versatates are not the preferred vinyl ester monomers. For example, *Weissgerber* never exemplifies any versatic acid ester, but instead employs vinyl laurate as a comonomer in all his examples. Vinyl laurate is not an ester of a branched carboxylic acid, but of a linear carboxylic acid. Some confusion may exist because Applicants mistakenly included vinyl laurate as a "c)" monomer. However, since lauric acid is not branched, it is clear that it is not within the scope of the claims. The specification has been amended to delete reference to this compound, and claims 3 and 10-16 have been correspondingly amended. Applicants apologize for this error, which is clear on its face and inadvertent.

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<sup>2</sup> As is well known, vinyl versatates are vinyl esters of branched acids which may have as few as 5 carbon atoms. Some vinyl versate homopolymers have  $T_g < 0$  while others have  $T_g > 0$ . Veova9, the 9 carbon carboxylic acid ester, for example, is not a "c)" component, but a "b)" component. See the specification, page 3, last ¶ (homopolymer  $T_g > 0$ ).

Thus, *Weissgerber* fails to direct the skilled artisan toward any vinyl ester of a branched carboxylic acid. The *Weissgerber* polymers which are exemplified are thus further removed from those claimed by disclosing a clear preference for monomers which fail to meet two of the claim limitations: presence of a monomer c) and absence of alkylacrylates.

Thus, the present case is analogous to cases such as those discussed previously, and also *In re Kollman*, 201 USPQ 193 (CCPA 1979), and *In re Sivaramakrishnan*, 213 USPQ 441 (CCPA 1982), where despite being within the broad teachings of the references, the claimed inventions were held not anticipated, because the prior art failed to highlight the claimed combination of elements from among the many disclosed by the art. This case is “on all fours” with those cases. Reversal of the rejection under 35 U.S.C § 102(b) is solicited.

Nor can there be anticipation based on any theory of inherency. To anticipate inherently, the inherency must be certain *Ex parte Cyba*, 155 USPQ 756 (POBA) and must be a necessary result and not merely a possible result. *Ex parte Keith*, 154 USPQ 320 (POBA 1966). Here, *Weissgerber*’s broadest disclosure contains many, many polymers which do not meet Applicants’ claims. Thus, arriving at Applicants’ claimed copolymers is not a necessary result, only a possible result, and for which no direction is provided.

For example, with the exception of the presence of *Weissgerber*’s required hydroxyalkyl compounds, the monomer combinations of Applicants’ Comparative Examples C11-C15 all would fall within *Weissgerber*’s monomer ranges. C11 and C12 are vinyl acetate and ethylene copolymers, with acrylic acid as a further monomer. However, tack is low, shear strength is exceptionally low, and peel strength inadequate. Yet, save for *Weissgerber*’s required presence of 2-hydroxyalkyl monomers, these polymers fully meet all other *Weissgerber* requirements.


C13-C15 are all vinyl acetate, ethylene, 2-ethylhexylacrylate copolymers (also acrylic acid), i.e. very similar to the exemplified polymers of *Weissgerber*. The addition of 2-ethylhexylacrylate renders these polymers tacky. However, also due to the presence of 2-

ethylhexylacrylate, all would have serious 2-ethylhexanol emissions. It must be emphasized that all these Comparative Examples are well within the monomer ranges taught by *Weissgerber*, except for the presence of 2-hydroxyalkyl monomers.

Claim 17 has been rejected under 35 U.S.C. § 103(a) over *Weissgerber* in view of "applicants' admission." Applicants do not agree. Their "admission" is limited to the fact that prior art drying methods (i.e. spray drying), may be used to form redispersible powders. However, no admission that this conventional process has been applied to the same or even similar polymers has been made. Factually, polymers such as those claimed, which are prepared using surfactants rather than colloidal dispersions, are ordinarily not spray dried. However, to expedite prosecution and limit issues on appeal should be necessary, Applicants have cancelled claim 17.

Applicants submit that the claims are now in condition for Allowance, and respectfully request a Notice to that effect. If the Examiner believes that further discussion will advance the prosecution of the Application, he is highly encouraged to telephone Applicants' attorney at the number given below.

Respectfully submitted,  
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Attachment

**VERSION WITH MARKINGS TO SHOW CHANGES MADE****In The Specification**

Please replace the paragraph beginning on page 4, line 4 with the paragraph shown below:

Suitable vinyl esters c) from the group of vinyl esters of branched carboxylic acids having 8 to 12 carbon atoms whose homopolymers have a glass transition temperature  $T_g < 0^\circ\text{C}$  are vinyl 2-ethylhexanoate, [vinyl laurate,] vinyl esters of  $\alpha$ -branched monocarboxylic acids having 10 or 11 carbon atoms (VeoVa10®, VeoVa11®, trade names of Shell), and vinyl esters of branched monocarboxylic acids having 10 to 13 carbon atoms (Exxar Neo12). Preference is given to the vinyl esters of  $\alpha$ -branched monocarboxylic acids having 10 or 11 carbon atoms (VeoVa10®, VeoVa11®). Most preferably, from 10 to 45% by weight of vinyl esters c) are copolymerized.

**In The Claims**

3. (Amended) The low-emission adhesive as claimed in claim 1, wherein vinyl esters c) copolymerized are at least one member selected from the group consisting of vinyl 2-ethylhexanoate, [vinyl laurate,] vinyl esters of  $\alpha$ -branched monocarboxylic acids having 10 or 11 carbon atoms, and vinyl esters of branched monocarboxylic acids having 10 to 13 carbon atoms.

10. (Amended) The process of Claim 8 wherein the covering is a ceiling covering[.]

14. (Amended) The vinyl ester ethylene copolymer of claim 13, wherein said vinyl ester whose homopolymers have a glass transition temperature  $T_g > 0^\circ\text{C}$  are

selected from the group consisting of vinyl acetate, vinyl propionate, vinyl butyrate, and mixtures thereof.

15. (Amended) The vinyl ester ethylene copolymer of claim 13, wherein said vinyl ester whose homopolymers have a glass transition temperature  $T_g < 0^\circ\text{C}$  are selected from the group consisting of vinyl esters of 2-ethylhexanoic acid, [lauric acid,]  $\alpha$ -branched monocarboxylic acids having 10 or 11 carbon atoms and vinyl esters of branched monocarboxylic acids having 10-13 carbon atoms, and mixtures thereof.

16. (Amended) The vinyl ester ethylene copolymer of claim 14, wherein said vinyl ester whose homopolymers have a glass transition temperature  $T_g < 0^\circ\text{C}$  are selected from the group consisting of vinyl esters of 2-ethylhexanoic acid, [lauric acid,]  $\alpha$ -branched monocarboxylic acids having 10 or 11 carbon atoms and vinyl esters of branched monocarboxylic acids having 10-13 carbon atoms, and mixtures thereof.